MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

TCP3151 – INTEGRATIVE PROGRAMMING AND TECHNOLOGIES

(All sections / Groups)

16 October 2017
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 7 pages excluding the cover page.
2. Attempt all FIVE questions.
3. All questions carry equal marks and the distribution of the marks for each question is given.
4. Please write your answers in the Answer Booklet provided.

QUESTION 1 (10 MARKS)

a) All decent programming languages are either compiled or interpreted. List TWO examples of compiled and interpreted programming language respectively.

(3 marks)

b) Multi-tier architectures are a way of distributing application processing across a number of different processes. List TWO advantages of using the multitier architecture.

(4 marks)

c) Middleware is defined as the software layer that lies between the operating system and the applications on each site of the system. Identify THREE main categories of middleware.

(3 marks)

Continued...

QUESTION 2 (10 MARKS)

a) What is means by native compiler? Draw a diagram to show the compilation of a native compiler.

(2 marks)

b) Component Object Model (COM) is used to enable inter-process communication object creation in a large range of programming languages. List FOUR advantages of using the COM.

(4 marks)

c) Your friend plan to set up a new company in Melaka. In this new company, your friend decides to use the distributed system to handle the daily operation. List FOUR challenges faced by your friend if the distributed system is used.

(4 marks)

Continued...

QUESTION 3 (10 MARKS)

a) Can XML replace the use of HTML? Please specify TWO reasons to support your answer.

(3 marks)

b) You are involved in a software development of a stationary management system. You are requested by your team leader to design the XML document to store the stationary data. You have finished some of the XML design based on the requirement from the owner. Construct the logical view of the XML document below so that you can present it during the next meeting.

```
<?xml version="1.0"?>
<shop>
    <stationary code="101">
        <name>pen</name>
        <description>pilot G-2 0.5 blue</description>
        <price>RM5.30</price>
        <quantity>20</quantity>
    </stationary>
    <stationary code="111">
        <name>ruler</name>
        <price>RM1.20</price>
        <quantity>50</quantity>
        <supplier code="8">KK Sdn Bhd</supplier>
    </stationary>
</shop>
```

(4 marks)

c) When should CDATA section to be used in XML? Write ONE example of XML that contains the CDATA section.

(3 marks)

Continued...

QUESTION 4 (10 MARKS)

a) You are a team member who is responsible for designing the database. Currently, the team is requested by your client to store the weather data using XML. Your colleague already designed the XML document as given below. You are requested to write the DTD based on the given XML.

```
<?xml version="1.0"?>
<!DOCTYPE weather SYSTEM "http://fist.mmu.edu.my/mydoc.dtd">

<weather>
  <date>30-08-2017</date>
  <temperature scale="high" degree="C">30</temperature>
</weather>
```

(4 marks)

b) Extensible Stylesheet Language Transformations (XSLT) is a programming language that transforms one XML document into another document in some format such as HTML, XML and plain text. Use XSLT to retrieve the content of restaurant name and phone for capacity which is less than 150 from following XML document and displays it in a HTML output.

```
<record>
  <restaurant name="La Pasteria" rate="3">
    <address>8, Jalan Kuching, 89200 Selangor</address>
    <capacity>300</capacity>
    <phone>06-2899808</phone>
    <phone>06-2829818</phone>
  </restaurant>
  <restaurant name="Nyonya Baba" rate="8">
    <address>25, Jalan Bukit, 75450 Melaka</address>
    <capacity>80</capacity>
    <phone>012-6669258</phone>
  </restaurant>
  <restaurant name="Ikan Bakar" rate="4">
    <address>2, Jalan Sungai, 75100 Johor</address>
    <capacity>120</capacity>
    <phone>
      <phone1>06-2855413</phone1>
      <phone2>06-2856418</phone2>
    </phone>
  </restaurant>
</record>
```

Continued...

The HTML output is shown below:

```
<html>
   <body>
      <p>Nyonya Baba</p>
      <p>012-6669258</p>
      <p>Ikan Bakar</p>
      <p>
         06-2855413
         06-2856418
      </p>
   </body>
</html>
```

(4 marks)

c) XPath stands for XML Path Language. It uses a non-XML syntax to provide a flexible way of addressing different parts of an XML document. Write the path expression based on the given conditions below to retrieve the textual or element information from the XML document in Q4(b).

i. Retrieve the addresses of all restaurants. (1 mark)

ii. Retrieve name attribute of restaurant that having the rate less than 4. (1 mark)

Continued...

QUESTION 5 (10 MARKS)

a) Write the correct steps to call an instance method of Java Native Interface (JNI).

(3 marks)

b) There are TWO errors found in the below code. Identify the errors using line number provided at the left side. You are required to explain the reason of the errors found.

```
1.  JNIEXPORT jint JNICALL Java_IntArray_sumArray(
2.  JNIEnv *env,  jintArray arr)
3.  {
4.     int i, sum = 0;
5.     for (i=0; i<10; i++) {
6.       sum += arr[i];
7.     }
8.  }
```

(3 marks)

c) JNI program involves the interoperation between Java and C file. Java file (Welcome.java) below consists of a native method (display()).The C implementation file (CWelcome.c) is used to implement the display method from Java file. Fill in the correct code in the missing portion of C implementation file to display a welcome message together with the name of the user as shown below.

```
Enter your name: Steven
Hello Steven, Welcome to JNI
```

```
// Greeting.java

import java.util.Scanner;

class Welcome {
public native void display(String name);

    static   {
          System.loadLibrary("CWelcome");
    }

     public static void main(String[] args) {
          Scanner ab = new Scanner(System.in);
          System.out.printf("Enter your name: ");
          String name = ab.nextLine();

          Welcome hw = new Welcome();
```

Continued...

```
            hw.display(name);
        }
}
```

```
// CWelcome.c

#include "jni.h"
#include "stdio.h"

JNIEXPORT void JNICALL Java_Welcome_display (JNIEnv *env,
jobject obj, jstring nm) {

const char *person;

  // write your code here
  [                                                    ]
  [                                                    ]
  [                                                    ]

}
```

(4 marks)

End of Paper